



Appl. No. : 10/649,663 Confirmation No. 6928
Applicant : N. SHIMOZONO et al.
Filed : August 28, 2003
Title : SWITCH PROVIDED WITH CAPABILITY OF
SWITCHING A PATH
TC/AU : 2836
Examiner : TBA
Docket No. : ASA-1150
Customer No.: 24956

PETITION TO MAKE SPECIAL
UNDER 37 CFR §1.102(d) (MPEP §708.02(VIII))

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Applicants petition the Commissioner to make the above-identified application special in accordance with 37 CFR §1.102(d). In support of this Petition, pursuant to MPEP § 708.02(VIII), Applicants state the following.

(A) REQUIRED FEE

This Petition is accompanied by the fee set forth in 37 CFR § 1.117(h). A Credit Card Payment Form in the amount of \$130 accompanies this Petition in satisfaction of the fee. The Commissioner is hereby authorized to charge any

additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.

(B) ALL CLAIMS ARE DIRECTED TO A SINGLE INVENTION

All the pending claims of the application, claims 1-10, are directed to a single invention. If the Office determines that all claims in the application are not directed to a single invention, Applicant will make election without traverse as a prerequisite to the grant of special status.

The claimed invention, as set forth in independent claims 1 and 8, is generally directed to a switch and a method whereby, when trouble is detected in a path, the switch will transmit subsequent commands from a computer through an alternate path. Claim 1 is directed to a switch connected with a storage unit via a plurality of communication lines, and also being connected to a computer. The switch includes a plurality of interfaces connected with the storage unit or the computer, and an internal switch for connecting the plurality of interfaces with one another. A first interface of the plurality of interfaces receives a command from the computer, and transfers the command to the storage unit through a first communication line of the plurality of communication lines. If trouble is detected in the first communication line, a frame is transmitted to the computer for noticing an error of the received command to the computer. After the frame noticing the computer of the error is transmitted to the computer, the interface transfers a command to be received from the computer to

the storage unit through a second communication line, different from the first communication line.

Similarly, independent claim 8 is directed to a method of transferring a frame in a switch connected with a storage unit and a computer. A command is received from the computer and then the command is transferred to the storage unit through a first communication line. A trouble may be detected as occurring in the first communication line, and a frame is transmitted for noticing an error of the received command to the computer. After the frame is transmitted to the computer, a command to be received from the computer is transferred into the storage unit through a second communication line, different from the first communication line.

(C) PRE-EXAMINATION SEARCH

A careful and thorough pre-examination search has been conducted, directed to the invention as claimed. The pre-examination search was conducted in the following *US Manual of Classification* areas:

<u>Class</u>	<u>Subclass</u>
370	217, 218, 225, 228, 389
709	239
714	4, 7

Furthermore, a keyword search was conducted on the USPTO's EAST database. Additionally, a literature search was conducted for relevant non-patent documents using the Association for Computing Machinery online databases. In addition, a search for foreign patent documents was conducted on the European Patent Office's ESPACENET databases.

(D) DOCUMENTS DEVELOPED BY THE PRE-EXAMINATION SEARCH

Of the documents reviewed during the search, those deemed to be most closely related to the subject matter encompassed by the claims are listed below. These documents were made of record in the present application by the Information Disclosure Statement filed January 10, 2005.

<u>Document No.</u>	<u>Inventor</u>
US 6128750	Espy, James W. et al.
US 6260158	Purcell, Brian T. et al.
US 6571355	Linnell, Thomas
US 6687758	Craft, Peter K. et al.
US 6701411	Matsunami, Naoto et al.
US 6775230	Watanabe, Naoki et al.
US 20040114588	Bhaskaran, Sajit

Additionally, the following documents were made of record in the present application by the Information Disclosure Statement filed August 28, 2003.

<u>Document No.</u>	<u>Inventor</u>
JP10021016	Uchida, Mitsujirou
EP0889410	Chong, Fay

Because all of the above-listed documents are already of record in the present application, in accordance with MPEP § 708.02(VIII)(D), additional copies of these documents have not been submitted with this Petition.

(E) DETAILED DISCUSSION OF THE REFERENCES

A discussion of each the above-listed documents is set forth below, pointing out, with the particularity required by 37 CFR 1.111 (b) and (c), how the claimed subject matter is patentable over the teachings of the above-listed documents.

The patent to Espy, US 6128750, shows a fail-over switching system that includes a switch that may route requests to either of two communications paths. Upon detection of a malfunction on a first of the paths, if the first fail-over switch is unable to communicate the data request to a storage device over the first communication path, the first fail-over switch may route the data request over the second communication path. (See, e.g., Abstract and column 1, lines 54-65.) However, Espy does not include a computer connected to the switch, and, if trouble is detected in a first communication line, the switch of Espy does not transmit a frame for noticing the computer of an error of a received command, as set forth in claims 1 and 8. Accordingly, claims 1 and 8 are patentable over Espy.

The patent to Purcell, US 6260158, shows a system and method for maintaining communications within a computer system following a data transport failure across a first link. Upon detection of a failure condition between two processors across the first link, the processors engage fail-over mechanisms to preserve uncompleted data transactions until communications are re-established across a secondary link. If a data transport signals a loss of connectivity, all pending and new transactions to the particular remote processor are posted to the data send service's fail-over queue, which is used during link re-establishment. (See, e.g., Abstract, column 3, lines 23-35, and column 5, line 43 – column 6, line 19.) Thus, Purcell does not transmit a frame for noticing a computer of an error of a received

command if trouble is detected in a first communication line, as set forth in claims 1 and 8. Accordingly, claims 1 and 8 are patentable over Purcell.

The patent to Linnell, US 6571355, shows a fibre channel system having a plurality of disk drives with redundant ports. A pair of sources of data is provided, and the system includes a pair of fibre channel port by-pass cards. Each one of the cards has an input/output port connected to a corresponding one of the sources of data. Each one of the port by-pass cards provides a fibre channel loop between the input/output port thereof and a corresponding one of the pair of ports of a one, or ones, of the disk drives selectively in accordance with a control signal fed to the port by-pass card by the one of the pair of sources coupled to the input/output port. Each one of the port by-pass cards has a fail-over controller and a switch, with the switch being coupled to the input/output port of such one of the port by-pass cards. Each one of the fail-over controllers produces a control signal from the source coupled thereto indicating a fault in the other one of the sources. The control signal activates the switch in the port by-pass card coupled to the other one of the sources to decouple the other one of the sources from the disk drives. (See, e.g., Abstract and column 2, lines 24-51.) Thus, Linnell does not teach the present invention, and does not include a switch that transmits a frame for noticing a computer of an error of a received command if trouble is detected in a first communication line, and after the frame noticing the computer of the error is transmitted to the computer, a command to be received from the computer is transferred through a different communication

line, as set forth in claims 1 and 8. Accordingly, claims 1 and 8 are patentable over Linnell.

The patent to Craft, US 6687758, shows a system that includes at least one intelligent network interface card (INIC) coupled to a host computer to offload protocol processing for multiple network connections, for reducing the protocol processing of the host. Plural network connections can maintain, via plural INIC ports and a port aggregation switch, an aggregate connection with a network node, thereby increasing bandwidth and reliability for that aggregate connection. Mechanisms are provided for managing this aggregate connection, including determining which port to employ for each individual network connection, and migrating control of an individual network connection from a first INIC to a second INIC. (See, e.g., Abstract and column 1, line 66 – column 2, line 10.) Hence, Craft does not teach a switch that transmits a frame for noticing a computer of an error of a received command if trouble is detected in a first communication line, and after the frame noticing the computer of the error is transmitted to the computer, a command to be received from the computer is transferred through a different communication line as set forth in claims 1 and 8. Accordingly, claims 1 and 8 are patentable over Craft.

The patent to Matsunami, US 6701411, shows a switch and storage system that includes a storage device having a record medium for holding data, a plurality of

storage sub-systems having a controller for controlling the storage device, a first interface node coupled to a computer using the data stored in the plurality of storage sub-systems, a plurality of second interface nodes connected to any or one of the storage sub-systems, and a switch connecting between a first interface node and a plurality of second interface nodes to perform frame transfer between a first interface node and a plurality of second interface nodes based on node address information added to the frame. The first interface node preferably has a configuration table to store structural information for the memory storage system and a processing unit to analyze the applicable frame in response to the frame sent from the computer, converts information relating to the transfer destination of that frame based on structural information held in the configuration table, and transfers that frame to the switch. (See, e.g., Abstract and column 2, lines 30-67.) However, Matsunami does not show a switch that transmits a frame for noticing a computer of an error of a received command if trouble is detected in a first communication line, and after the frame noticing the computer of the error is transmitted to the computer, the switch transfers a command to be received from the computer through a different communication line, as set forth in claims 1 and 8. Accordingly, claims 1 and 8 are patentable over Matsunami.

The patent to Watanabe, US 6775230, shows a method and a system for selecting an alternate path from a path group having a plurality of Fibre Channel paths in a storage area network. The system includes a host having a processor and

a memory, and a switch including a processor and a memory, coupled to the host by a Fibre Channel path. The switch memory stores a data structure having the path group for determining the alternate path. A storage system, including at least one logical volume, is coupled to the switch by at least two Fibre Channel paths. In addition, the switch may select an alternate path when an established path between the switch and the storage system fails, or when an established path between the switch and the storage system has a usage above a pre-determined threshold. (See, e.g., Abstract and column 2, lines 28-67.) Thus, Watanabe does not teach a system in which a switch transmits a frame for noticing a computer of an error of a received command if trouble is detected in a first communication line, and after the frame noticing the computer of the error is transmitted to the computer, the switch transfers a command to be received from the computer through a different communication line, as set forth in claims 1 and 8. Accordingly, claims 1 and 8 are patentable over Watanabe.

The published US patent application to Bhaskaran, US 20040114588, shows a network having a packet switch with at least two forwarding engines within the packet switch controlled by a control processor. A well-defined protocol among these elements allows the control processor to direct task migration from one forwarding engine to a second forwarding engine with no disruption to applications. Packets which initially flow through the first forwarding engine are migrated to the second forwarding engine that can be running different code or have a different

configuration. (See, e.g., Abstract and paragraphs [0017]-[0018].) Thus, Bhaskaran does not teach the present invention, in which a switch transmits a frame for noticing a computer of an error of a received command if trouble is detected in a first communication line, and after the frame noticing the computer of the error is transmitted to the computer, the switch transfers a command to be received from the computer through a different communication line, as set forth in claims 1 and 8. Accordingly, claims 1 and 8 are patentable over Bhaskaran.

Japanese Patent No. JP10021016, to Uchida, discloses a technique of switching an access path between a storage system and a computer. The storage system detects a trouble occurring in an access path to a storage unit included in the storage system itself, and gives back an error response for indicating use of another access path to the computer so that the computer may reissue a request for accessing another access path, for switching the access path. This requires that the capability of switching paths be added to the computer. Thus, all computers in a network would be required to have the necessary capability installed. (See, e.g., Abstract of Uchida and discussion in the specification of the present application at pages 1-3.) Thus, Uchida does not teach a system in which a switch transmits a frame for noticing a computer of an error of a received command if trouble is detected in a first communication line, and after the frame noticing the computer of the error is transmitted to the computer, the switch transfers a command to be

received from the computer through a different communication line, as set forth in claims 1 and 8. Accordingly, claims 1 and 8 are patentable over Uchida.

European Patent Application, EP0889410 (equivalent to JP-A-11-120092 and US6070251), to Chong, discloses a technique of access between a computer and a storage system that controls a storage unit provided with two or more connecting ports. When trouble takes place in one access path to the storage unit, the storage system is accessed by the computer through another access path, so that a fail-over is transparent to the computer. In this case, the storage system includes a cache memory for the purpose of improving the performance. This cache memory may be used as a buffer that saves a retry command and data to be transferred. However, this technique burdens the switching requirements with an extra memory, thereby making the overall system more costly. (See, e.g., Abstract of Chong and discussion in the specification of the present application at pages 1-3.) Thus, Chong does not teach a system in which a switch transmits a frame for noticing a computer of an error of a received command if trouble is detected in a first communication line, and after the frame noticing the computer of the error is transmitted to the computer, the switch transfers a command to be received from the computer through a different communication line, as set forth in claims 1 and 8. Accordingly, claims 1 and 8 are patentable over Chong.

CONCLUSION

The Applicants submit that the foregoing discussion demonstrates the patentability of independent claims 1 and 8 over the closest-known prior art, taken

either singly, or in combination. The remaining claims, claims 2-7 and 9-10, depend from claims 1 or 8, claim additional features of the invention, and are patentable at least because they depend from allowable base claims. Accordingly, the requirements of 37 CFR §1.102(d) having been satisfied, the Applicants request that this Petition to Make Special be granted and that the application be examined according to prescribed procedures set forth in MPEP §708.02 (VIII).

The Applicants prepared this Petition in order to satisfy the requirements of 37 C.F.R. §1.102(d) and MPEP §708.02 (VIII). The pre-examination search required by these sections was “directed to the invention as claimed in the application for which special status is requested.” MPEP §708.02 (VIII). The search performed in support of this Petition is believed to be in full compliance with the requirements of MPEP §708.02 (VIII); however, Applicants make no representation that the search covered every conceivable search area that might contain relevant prior art. It is always possible that prior art of greater relevance to the claims may exist. The Applicants urge the Examiner to conduct his or her own complete search of the prior art, and to thoroughly examine this application in view of the prior art cited above and any other prior art that may be located by the Examiner’s independent search.

Further, while the Applicants have identified and discussed certain portions of each cited reference in order to satisfy the requirement for a “detailed discussion of the references, which discussion points out, with the particularity required by 37 C.F.R. §1.111(b) and (c), how the claimed subject matter is patentable over the references” (MPEP §708.02(VIII)), the Examiner should not limit review of these

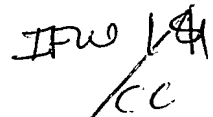
documents to the identified portions, but rather is urged to review and consider the entirety of each reference.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Colin D. Barnitz". The signature is fluid and cursive, with the first name "Colin" being more prominent and the last name "Barnitz" following in a similar style.

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ASA-1150

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